

**WHAT IS CLAIMED IS:**

1. A keypad defining both exposed valley keys (14) and exposed hill keys (12) elevated above the valley keys,

5 the hill keys (12) having a nominal effective key width (H) substantially equal to a nominal effective key width (V) of the valley keys.

10 2. The keypad of claim 1 wherein at least many of the hill keys (12) are each associated with a corresponding hill key (12), such that adjacent pairs of the hill keys (12) and connecting regions (37) form elongated dual keys (16).

3. A keypad defining both exposed valley keys (14) and exposed hill keys (12) elevated above the valley keys,

15 wherein at least many of the hill keys (12) are each functionally associated with a corresponding hill key (12), with adjacent pairs of the hill keys (12) and connecting regions (37) of the keypad forming elongated dual keys (16).

20 4. The keypad of claim 2 or claim 3 wherein the connecting region (37) is in the form of a locally elevated bridge.

5. The keypad of claim 4 wherein the bridge narrows, as viewed normal to the keypad, to form a waist (38) between the adjacent hill keys (12).

25 6. The keypad of claim 4 or claim 5 wherein the bridge slopes downward toward its midpoint to form a saddle (36) between the adjacent hill keys (12).

7. The keypad of any of claims 2 through 6 wherein at least many of the dual keys (16) have left sides (32) and right sides (34) with different identifying labels.

30 8. The keypad of any of claims 2 through 7 wherein the dual keys (16) overlay electrical traces (28) of a circuit board (30) and are associated with

conductive actuators (40) normally spaced apart from the electrical traces (28) and brought into electrical contact with the traces when their associated hill keys (12) are depressed.

5 9. The keypad of claim 8 wherein each dual key (16) is associated with only one, elongated actuator (40).

10 10. The keypad of claim 9 wherein the elongated actuator (40) has a lower surface curved along its length.

10 11. The keypad of any of claims 8 through 10 wherein each dual key (16) is associated with only one, elongated tactile feedback element (48).

15 12. The keypad of claim 8 wherein at least many dual keys (16) are each associated with a pair of actuators (40), each of the pair of actuators underlying one of the pair of hill keys (12) of the dual key (16).

20 13. The keypad of claim 12 wherein both of the actuators (40) of the pair of actuators are arranged to engage a single electrical trace (28) of the circuit board (30).

25 14. The keypad of claim 12 wherein each of the actuators (40) of the pair of actuators is arranged to engage a different electrical trace (28) of the circuit board (30).

15. The keypad of any of claims 12 through 14 wherein at least many dual keys (16) are each associated with a pair of tactile feedback elements (48), each of the pair of feedback elements underlying one of the pair of hill keys (12) of the dual key (16).

30 16. The keypad of any of claims 2 through 15 wherein the valley keys (14) are arranged in columns, with alternating columns containing dual keys (16).

17. The keypad of any of claims 2 through 16 wherein each dual key (16) is configured as a rigid key structure (80) displaceable as a unit with respect to an underlying circuit board (30).

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18. The keypad of claim 17 wherein the rigid key structure (80) of each dual key (16) also spans at least one adjacent valley key (14).

10 19. The keypad of claim 18 wherein the rigid key structures (80) forming at least several of the dual keys (16) also span two adjacent valley keys (14), one on either side of the dual key (16).

15 20. The keypad of claim 17 wherein the dual keys (16) are disposed in alternating rows separated by rows of valley keys (14).

21. The keypad of any of claims 2 through 20 wherein adjacent pairs of valley keys (14) are structurally linked such that displacing one of the valley keys (14) of the pair of valley keys toward an underlying circuit board (30) displaces the other of the valley keys (14) of the pair of valley keys away from the circuit board.

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22. The keypad of claim 21 wherein each pair of valley keys (14) includes a lever spanning the pair of valley keys and pivotable about a pivot point (86) between the spanned valley keys (14).

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19. The keypad of claim 18 wherein the lever (84) contacts the circuit board (30) at the pivot point (86).

20. The keypad of claim 18 wherein the pivot point (86) contacts a snap dome (50).

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21. The keypad of claim 20 wherein snap domes (50) beneath pivot points (86) are configured to provide a higher feedback force than snap domes (50) associated with hill keys (12).

5 22. The keypad of any of claims 2 through 16 further comprising pivotable members (84) each spanning two hill keys (12) of different dual keys (16), and a valley key (14), such that displacing one of the spanned hill keys (12) toward an underlying circuit board (30) displaces the other of the spanned hill keys (12) away from the circuit board.

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23. The keypad of any of the above claims wherein exposed surfaces of the valley keys (14) are convex.

15 24. The keypad of any of claims 1 through 23 wherein the valley keys (14) comprise locally elevated regions that are recessed with respect to the hill keys (12).

25. The keypad of any of the above claims wherein centers of adjacent valley keys (14) are spaced apart by a distance of less than about six millimeters.

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26. The keypad of any of the above claims wherein centers of adjacent valley keys (14) are spaced apart by a distance of about 5.4 millimeters.

27. The keypad of any of the above claims wherein at least many hill keys (12) are each associated with at least six valley keys (14).

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28. The keypad of any of the above claims with a row of key labels arranged to read, from left to right, Q-W-E-R-T-Y.

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29. The keypad of any of the above claims wherein the hill keys (12) provide a corresponding output when individually pressed, and wherein the valley keys (14) are labeled to correspond with an output that results at least from the

simultaneous or near-simultaneous manipulation of a predetermined set of two or more hill keys (12) adjacent the valley key (14).

30. The keypad of any of the above claims wherein only the hill keys (12) provide an electrical response when actuated, the outputs corresponding to labels of the valley keys (14) being derived only from combinations of electrical responses from actuation of adjacent hill keys (12).

31. The keypad of any of the above claims wherein the valley keys (14) are algorithmically associated with adjacent hill keys (12).

32. The keypad of claim 31 wherein key output is determined both from individual switch activation and from combined activation of adjacent switches.

33. An electronic device having a keypad of any of the above claims wherein the hill keys (12) each provide a corresponding output when individually pressed, and wherein the valley keys (14) each provide an output that overrides any simultaneous or near-simultaneous manipulation of any one hill key (12) adjacent the valley key (14).